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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,636	12/28/2000	Yoshinobu Suehiro	P 275747 TYGUS001	6023

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EXAMINER

KEANEY, ELIZABETH MARIE

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/749,636

Applicant(s)

SUEHIRO ET AL.

Examiner

Elizabeth Keaney

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of the Remarks and Amendments filed 31 March 2004.

Response to Arguments

Applicant's arguments, see pages 11 and 12, filed 31 March 2004, with respect to the rejection(s) of claim(s) 1 and 3-22 under 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Suehiro et al. (US Patent 5,623,181; hereinafter Suehiro) and Kamada et al. (US Patent 6,331,063; hereinafter Kamada).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: how the light-transmissible material relates to the rest of the device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3-17,19,20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro in view of Kamada.

Re claims 1,5,7,10,11,13,14 and 22: Suehiro discloses in figure 3 and throughout the disclosure, a light-emitting diode comprising:

- a light-emitting element (111);
- a lead assembly for supplying electrical power to the light-emitting element (122a,b);
- a reflection mirror provided in an opposing relation to the light-emitting surface of the light-emitting element (114), the light emitting element being a predetermined distance from a reflective surface of the reflection mirror;
- a light-transmissible material for sealing the light-emitting element, a part of the lead assembly and the reflection mirror (113);
- a radiation surface for radiating light reflected on the reflection mirror to the outside (115), wherein the radiation surface is formed on the light-transmissible material at its surface at the rear of the light-emitting element.

However, Suehiro fails to teach or fairly suggest the reflection mirror being formed by a metal plate pre-formed into a concave shape and a through-hole formed in the reflection mirror.

Kamada discloses a reflection mirror being formed by a metal plate pre-formed into a concave shape (column 15, line 13) and a through-hole formed in the reflection mirror (figure 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a pre-formed metal plate mirror within the LED disclosed by Suehiro in order to reduce manufacturing times, materials and inaccuracies with reflective film deposits.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a through-hole within the reflection mirror in order to prevent distortions forming in the metal plate during manufacturing.

Re claim 3: Suehiro discloses the distance from the edge of the reflective mirror to the edge of the sealing mass made of the light transmissible material is less than 1.0mm. Suehiro discloses the light transmissible material filling the entire concave opening, therefore the light transmissible material will butt up against the reflective mirror thereby making the distance less than 1.0 mm.

Re claim 4: Suehiro discloses, in figure 17 and throughout the disclosure, the light-transmissible material is essentially shaped like a square when viewed from the

Art Unit: 2882

side of the radiation surface and the lead assembly is led to the outside from the base of the light-transmissible material close to a corner of the square.

Re claim 5: Kasmada discloses the reflection mirror comprising a metal mirror, which is obtained by mirror-surface-treating the concave surface (column 15, lines 6-8).

Re claim 6: Suehiro discloses, in figure 3 and throughout the disclosure, the light-emitting element (111), part of the lead assembly (112a,b), and the reflection mirror (114) are sealed with a light-transmissible material (113) and the radiation surface (115) is formed on the light-transmissible material at its surface at the rear of the light-emitting element.

Re claim 8: Suehiro shows all the limitations above.

However, Suehiro fails to teach or fairly suggest the reflective mirror formed of ceramic.

Kamada discloses a reflection mirror comprised of ceramic (column 3, line 54).

It would have been obvious to substitute a ceramic reflective mirror for that of a metal mirror in order to improve the insulation properties of the overall LED (column 3, line 55).

Re claim 9: Kamada discloses the reflection mirror having a linear reflectance of 65% or higher. Since the mirror is made of metal, no light will be absorbed therefore the

Art Unit: 2882

mirror with have a linear reflectance of 100% which is within the range disclosed by the applicant.

Re claim 12: Kamada discloses the reflection mirror being obtained by mirror-surface treating the concave surface of the metal mirror (column 15, lines 7-8).

Re claim 15: Kamada discloses the metal plate serving as a material of the reflection mirror comprises one of copper, iron, and alloys mainly composed of those metals (column 3, line 61).

Re claim 16: Kamada discloses the metal plate serving as a material of the reflection mirror comprising one of aluminum and alloys mainly composed on aluminum (column 8, line 49).

Re claim 17: Kamada discloses the metal plat serving as a material of the reflection mirror comprises aluminum or alloys mainly composed of aluminum (column 8, line 49). Kamada further discloses mirror surface treating the reflection mirror on its concave surface (column 15, lines 7-8). The limitation "said reflection mirror receives alumite treatment on its concave mirror surface" is drawn to a product by process. Since the alumite treatment is a mirror surface treatment, Kamada discloses the final product implied by the process limitation.

Re claim 19: Kamada discloses, in figure 26, the reflection mirror (16A) includes around its circumference a rim whose surface extends in a direction parallel with a plane essentially perpendicular to the central axis of the reflection mirror.

Re claim 20: Suehiro discloses, in figure 4 and throughout the disclosure, the lead assembly (12a,b) with the light-emitting diode mounted thereon (11) is disposed in close relation to the reflection mirror.

Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro and Kamada in view of Singer et al. (US Patent 5,183,752; hereinafter Singer).

Re claim 18: Suehiro and Kamada show all the limitations above.

However, they fail to teach or fairly suggest the use of a light-emitting element that emits light in the ultra-violet region.

Singer teaches the use of an UV LED (column 1, line 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the light-emitting device of Suehiro and Kamada with that of a UV LED in order to improve the overall light emission of the light-emitting device. Thereby, the device produces a brighter light without any additional power usage.

Re claim 21: Suehiro, Kamada and Singer show all the limitations above. Suehiro further discloses, in figure 8, a lead assembly mount having a recess (182a). Singer further discloses a fluorescent material to convert the light emitted by the light emitting element to light of a different wavelength (figure 1, 32).

However, Suehiro, Kamada and Singer fail to teach or suggest a mount recess having a mouth, which opens towards the reflection mirror with the center of the mount being in alignment with the central axis of the reflection mirror.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a lead assembly mount having a recess, which opens towards the reflection mirror with the center of the mount being in alignment with the central axis of the reflection mirror because by recessing the light-emitting device the emission surface of the LED is recessed as well. When the emission surface is recessed, more surface area of the reflection mirror is utilized because the light emitted from the LED diffuses more efficiently. And by centering the recess, the amount of light reflected is maximized.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday-Thursday 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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PRIMARY EXAMINER